Energy Strategy

The Florida sun sets on another day as an F-16C reports back to Eglin Air Force Base.
(U.S. Air Force photo by Tech. Sgt. Andrew Leonhard)

Energy—it's a part of our daily lives. We can't live without it. For the United States Air Force, energy is its lifeblood. Without jet fuel, the fleet of high performance aircraft would be grounded. Without heat and gasoline, the many installations around the world could not function.

Maintaining a strong Air Force burns a lot of fuel—over 2.5 billion gallons of aviation fuel and 71 trillion BTUs of facility energy every year. Using this energy wisely is the cornerstone of building an Air Force capable of complete air domination, for today, tomorrow, and beyond.

A Responsibility

The Air Force is the largest energy consumer in the federal government. In fact, the Air Force uses more fuel than the Navy, Army, and Marines combined.

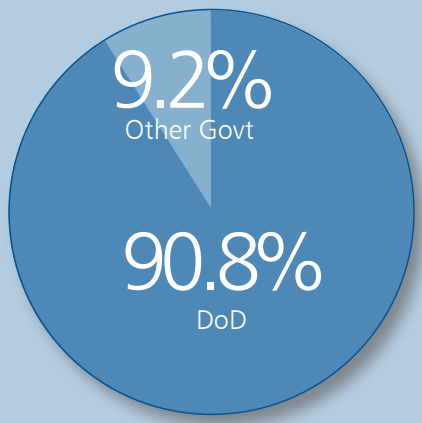
Being such a major consumer means that a $10 increase in the price of a barrel of oil translates into an additional $619 million in cost annually for the Air Force. Even though the entire Department of Defense uses less than 2% of the total energy consumed in this country, the Air Force recognizes its responsibility to make wise energy choices.

Excellence in all we do is an Air Force core value. When applied to making wise energy choices, the result is a culture where energy has become a major consideration in everything we do and an overall energy strategy that integrates demand-side energy efficiency with a long-term commitment to supply-side alternative energy sources.

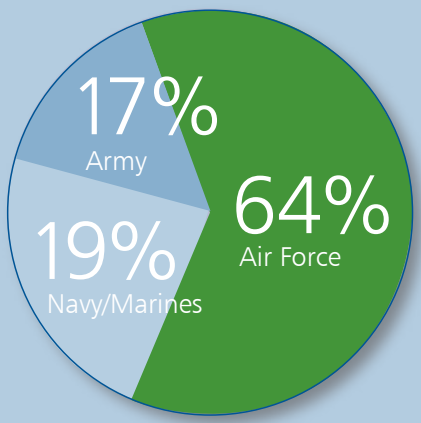
To accomplish this goal of energy efficiency, the Air Force is working in partnership with the Federal Aviation Administration (FAA), the National Air and Space Administration (NASA), the Department of Energy (DOE), the Environmental Protection Agency (EPA), and the commercial aviation industry as well as major energy sector companies.

Likewise, in our efforts to increase our supply, we are engaging in public-private partnerships with the commercial sector to develop and operate renewable power sources on our facilities, such as the photovoltaic solar array that recently went into operation at Nellis Air Force Base in Nevada.

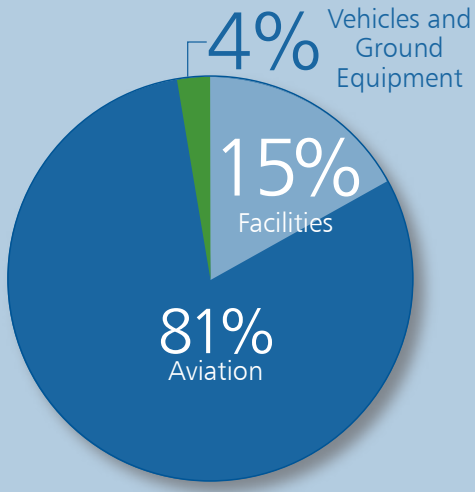
Because the Air Force uses more fuel than the other Armed Services combined, it bears the greatest responsibility in making wise energy choices.



FY 2007 Federal Government Consumption
(percent of total petroleum consumption in billions of British Thermal Units, preliminary data)



FY 2007 U.S. Armed Forces Fuel Utilization
(percent of total fuel cost)



FY 2007 U.S. Air Force Energy Utilization
(percent of total energy costs)

Sources: U.S. Department of Energy, Energy Efficiency and Renewable Energy, Federal Energy Management Program Preliminary Data; Defense Energy Support Center Fiscal Year 2007 (FY07) Cost Data; Air Force Total Ownership Cost Data; Fuels Enterprise System; Federal Automotive Statistical Tool (FAST) Data; and the Defense Utility Reporting System

An Answer

It is the Air Force's vision to *Make Energy A Consideration In All We Do*™—from turning off light switches in hanger facilities at the end of the day, to certifying and utilizing synthetic, less petroleum-reliant jet fuels.

The Air Force is proud to be a leader in our nation's ongoing quest to use our nation's energy more efficiently through better procedures and new technologies while at the same time, decreasing our energy consumption, especially in our use of imported oil.

To address this responsibility, the Air Force has developed a strategic vision to provide leadership in utilizing new energy options that include secure and reliable energy alternatives and increased energy-use efficiency.

As a result, the Air Force has adopted a three-point strategy that balances demand-side energy efficiency measures with a long-term commitment to supply-side alternative energy sources.

- **Reduce Demand:** The Air Force is committed to increasing our energy efficiency and awareness of the need to reduce our energy consumption. This has led to a 30% reduction in facility energy usage equating to a savings of 308 trillion BTUs and $2.9 billion since 1985—making the Air Force one of the biggest energy savers in the country.

- **Increase Supply:** The Air Force is committed to research, testing, and certifying new technologies, as well as renewable and sustainable resources in order to create new domestic sources of supply. This includes leveraging advances in renewable energy sources such as geo-thermal, wind, biomass and solar power and alternative synthetic derived from coal, natural gas, and biomass.

- **Culture Change:** The Air Force is creating a culture where all Airmen make energy a consideration in everything we do. By focusing on leadership efforts, training, curricula, and communication, we are building the foundation for a culture that will continuously reduce energy consumption. This strategy seeks to create a cultural change similar to previous awareness and behavioral changes created by safety and environmental programs.

These efforts have pushed the Air Force to the top of the Environmental Protection Agency's (EPA's) list of federal government purchasers of green power for three consecutive years and made it the 2006 winner of the U.S. EPA's Climate Protection Award. In addition, the Air Force was recognized with the 2007 Presidential Award for Leadership in Federal Energy Management and perennially receives recognition from the EPA's Green Power Partnership as the Number One green power purchaser in the federal government.

To turn this strategy into reality and to further emphasize the Air Force commitment, the Secretary of the Air Force chartered the Energy Senior Focus Group in 2006 to oversee the energy program. Last year, the Air Force won the Presidential Award as well as eight other awards for Leadership in Federal Energy Management.

It is the goal of the Air Force to maintain air dominance while decreasing our use of imported oil through the use of renewable energy, alternative fuels, and increased energy efficiency.

Demand-Side Programs

Currently sitting atop six carports, a photovoltaic array project at the 452nd Civil Engineer Squadron, March Air Reserve Base has the capacity to generate 460 kilowatts of electrical power. *(U.S. Air Force photo)*

> To assist in our efforts to communicate our energy strategy, every Airman should develop new ways to personally and organizationally conserve energy. Your efforts in making energy conservation a part of your day-to-day activities will benefit our entire Air Force, and free up precious dollars for other critical programs.
>
> - Letter to Airmen, Michael W. Wynne, Secretary of the Air Force, September 6, 2006

The Air Force is pursuing an aggressive three-part energy strategy that supports the President's goals of weaning this country off its addiction to foreign oil as well as the Energy Policy Act of 2005 requirements for reducing our nation's dependence on foreign energy sources. Our efforts are bearing fruit as we reduce energy demand via increased efficiency and conservation, increase domestic alternative energy supplies, and change our culture, making energy a consideration in everything we do.

Recent Air Force efforts included:

- Reducing our fuel demand by purchasing fuel-efficient equipment when possible, flying efficiently and instilling awareness so that energy conservation becomes an integral part of an Airman's mindset.
- Decreasing facility energy intensity by nearly 18% since 2003.
- Reducing our ground vehicle fleet fossil fuel consumption by 15% since 1999 (currently, working 13 additional fossil fuel conservation projects).
- Purchasing over 190,000 Energy Star®-compliant computers since July 2007.
- Implementing cost efficiencies, such as reducing aircraft weight and optimizing flight routes, where mission appropriate.

Increase Supply

By using renewable energy sources to power our bases and jet fuels made from alternative sources such as natural gas, coal, and biomass, we reduce our demand on foreign oil and remain good environmental stewards. We're focused on a sustainable future with energy sources that are less environmentally damaging than traditional sources of power.

Secure Sources of Energy

The Air Force is a renewable energy leader and we seek to expand our portfolio through innovative public-private partnerships. In December 2007, we powered up the largest photovoltaic solar array in the Americas (14 MW) at Nellis AFB, NV, for an estimated annual cost savings of $1 million. In 2007 the Air Force continued to lead the federal government in green power purchases, with 37 bases meeting some portion of their base-wide electrical requirements from commercial sources of wind, solar, geothermal, or biomass.

At Edwards AFB, CA, Kirtland AFB, NM, and Luke AFB, AZ, we are exploring commercial-scale opportunities for solar power; and, at Dyess AFB, TX, Fairchild AFB, WA, and Minot AFB, ND, 100% of the electrical energy purchased came from renewable sources.

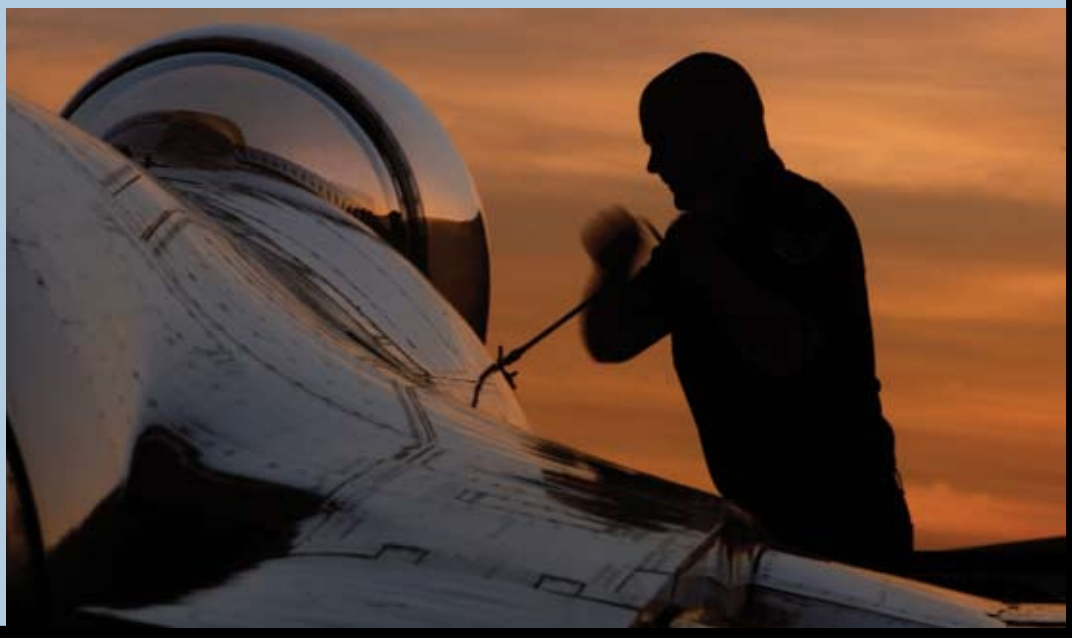
We have also begun to consider the potential for a small modular nuclear plant on an Air Force base.

Synthetic Aviation Fuels

Taking the lead to reduce dependence on foreign oil, the Air Force is evaluating a broad range of energy alternatives. As the Department of Defense's (DoD's) leading consumer of jet fuel, we are currently engaged in evaluating alternative fuels and engine technologies leading to greater fuel efficiency. We've certified the B-52 to fly on a synthetic fuel blend, and are on track to test and certify the C-17, B-1, and F-22 in the near future, with the remainder of all of our aircraft certified by early 2011.

The Air Force goal is to cost-effectively acquire 50% of our contiguous United States (CONUS) aviation fuel via a synthetic fuel blend utilizing domestic feedstocks produced in the United States by 2016. It is our intent to require that those synthetic fuel purchases are sourced from suppliers with manufacturing facilities that engage in carbon dioxide capture and effective reuse.

On under-utilized land at Malmstrom AFB, MT, we are exploring the potential for a privately financed and operated coal-to-liquid aviation fuel plant.



After a periodic inspection, the canopy of an F-16 Fighting Falcon is tightened at Nellis Air Force Base, Nevada. *(U.S. Air Force photo by Tech. Sgt. Justin D. Pyle)*

Culture Change

A B-52 Stratofortress powered by a 50/50 mix of synthetic fuel derived from the Fischer–Tropsch method and traditional crude-oil based fuel, completed cold weather testing in January 2007 at Minot Air Force Base, North Dakota.
(U.S. Air Force photo by Airman 1st Class Christopher Boitz)

The Air Force vision to *Make Energy A Consideration In All We Do*™ is more than a slogan. It's a conviction that since its adoption in September 2006 has already begun to bear fruit. We are committed to instilling energy awareness through focused leadership, energy-specific training, curriculum at the USAF Academy and other schools, and effective communication.

Throughout the Air Force, cross-functional Energy Management Steering Groups led by the Commander meet quarterly to integrate our aviation, facility, and ground equipment energy supply and demand priorities. Energy awareness is now part of the Levels of Proficiency that describe developmental outcomes for the Air Force's overarching Institutional Competencies.

Our efforts have been noticed on an international scale. We are collaborating with our allies and coalition partners on energy best practices and common issues to ensure an interoperable and sustainable future.

In 2007, the Air Force won the Presidential Award as well as eight other awards for Leadership in Federal Energy Management.

Path Forward

The mission of the Air Force is to deliver sovereign options for the defense of the United States of America and its global interests—to fly, fight, and win in air, space, and cyberspace. An uninterrupted supply of energy is essential in meeting this mission.

Our nation has entrusted us with its precious energy resources. It is everyone's responsibility to use these resources efficiently and prudently. Our nation's energy problems won't be resolved easily, but with patience and perseverance we can conserve our resources and become energy self-sufficient. In cooperation with other government agencies and academia, the Air Force hopes to lay a solid foundation that commercial aviation and other business entities can follow.

> "For too long our nation has been dependent on foreign oil. And this dependence leaves us more vulnerable to hostile regimes, and to terrorists who could cause huge disruptions of oil shipments, raise the price of oil, and do great harm to our economy."
>
> – George W. Bush, State-of-the-Union Address
> January 30, 2007

Senior Airman William Stell adjusts the water tank temperature in the heat exchanger of a new propane air-mix plant at Moody Air Force Base, Georgia. This plant converts liquid propane into a substitute for natural gas during high-priced billing periods. *(U.S. Air Force photo by Tech. Sgt. Parker Gyokeres)*

Air Force Energy Facts

- At the end of 2007, the Air Force was the number one purchaser of renewable energy in the federal government and number three in the United States, according to the U.S. Environmental Protection Agency (EPA).
- In 2007, the Air Force purchased almost 1 million megawatt-hours of green power, accounting for 9.5% of all Air Force electricity consumption.
- For five consecutive years (2003–2007), the Air Force has been first on the EPA's list of top 10 federal government green power purchasers.
- The Air Force is the biggest consumer in DoD energy usage at 64%.
- By early 2011, the Air Force will test and certify the entire inventory of aircraft for operations with a 50/50 synthetic fuel blend.
- By 2016, the Air Force plans to cost effectively acquire 50% of contiguous United States (CONUS) aviation fuel via a synthetic fuel blend utilizing domestic feedstocks and produced in the United States, with the intent to require that the synthetic fuel purchases be sourced from suppliers with manufacturing facilities that engage in carbon dioxide capture and effective reuse.
- For five consecutive years (2003–2007), the Air Force has reduced the amount of aviation fuel it has used.
- The Air Force leadership in fuels is a bridge to commercial aviation.

Energy Leadership

Today and Tomorrow